Errata for
Fast Algorithms for Linear and Kernel SVM+

Wen Li
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The version of the paper published in CVPR 2016 [1] contains several typos. We list the corrections as follows,

- The subscripts of $\tilde{x}$ in Eq. (14) and (16) of the original paper (Page 4, left column) should be corrected as $(i - n)$, when $n + 1 \leq i \leq 2n$. For the convenience of presentation, we define an index operator as $\sigma(i) = i$ if $1 \leq i \leq n$, and $\sigma(i) = i - n$ if $n + 1 \leq i \leq 2n$. Then, Eq. (14) and (16) are respectively updated as,

\[
\nabla_i f(\beta) = \tilde{w}' \tilde{x}_{\sigma(i)}, \quad \forall n + 1 \leq i \leq 2n,
\]

and

\[
\tilde{w} \leftarrow \tilde{w} + \frac{1}{\gamma} d \tilde{x}_{\sigma(i)}, \quad \text{if} \quad 1 \leq i \leq 2n
\]

- The calculation of $Q_{ii}$ is Algorithm 1 of the original paper should be consistent with the definition above Eq. (9) of the original paper, see the updated Algorithm 1.

Algorithm 1 Dual coordinate descent algorithm for solving the linear SVM+ problem

Input: \{$(x_i, \tilde{x}_i, y_i)\}_{i=1}^{n}\}, C$, and $\gamma$.
1: Initialize $w = 0$, and $\tilde{w} = -\frac{C}{\gamma} \sum_{i=1}^{n} \tilde{x}_i$.
2: Set $Q_{ii} = x'_i x_i + \frac{1}{\gamma} \tilde{x}'_i \tilde{x}_i$ for $1 \leq i \leq n$, and $Q_{ii} = \frac{1}{\gamma} \tilde{x}'_{\sigma(i)} \tilde{x}_{\sigma(i)}$ for $n + 1 \leq i \leq 2n$.
3: repeat
4: Randomly pick an index $i$.
5: if $1 \leq i \leq n$ then
6: Calculate $\nabla_i f(\beta)$ using (13).
7: else
8: Calculate $\nabla_i f(\beta)$ using (14).
9: end if
10: Calculate $d$ using (11) based on $Q_{ii}$ and $\nabla_i f(\beta)$.
11: if $1 \leq i \leq n$ then
12: Update $w$ using (15).
13: end if
14: Update $\tilde{w}$ using (16).
15: until The convergence criterion is reached.
Output: Weight vectors $w$ and $\tilde{w}$.

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References